

REMARKS / ARGUMENTS

This Request for Continued Examination is being filed subsequent to the Examiner's letter mailed 06/29/2006.

The responses set out below, are made in respect of the points made by the Examiner in his letter and in consequence to the changes to the claims as discussed more fully below.

In the examiner's initial office action, the examiner rejected claims 1, 2, 4, 6, 8 and 12 based on Bland, '631. At the same time the examiner initially indicated that claims 3, 5, 7, 13-14 and 21 were all objected to but would be allowable if rewritten in independent form. Claims 16-18 and 25-26 were also rejected but indicated as allowable if rewritten in independent form. At that time, applicant attempted to respond by addressing claims to the subject matter considered at that time by the examiner to be allowable, and cancelled claims 1, 2, 3 and 5. The dependencies of other of the claims were then amended to reflect what applicant thought the examiner had considered to be patentable subject matter.

In subsequent office actions, the examiner has had a change of mind and now continues to refuse patentability on any of the pending claims. With the refiling of this RCE, applicant is now reinserting claims substantially to the subject matter of initial claims 1, 2, 3 and 5. These claims are renumbered in view of the reinsertion of these claims and now bear the numerals 35, 36, 37 and 38.

Claims 15 and 16 were withdrawn in view of the examiner's indication of certain allowable subject matter. New claims 39 and 40 have been inserted with this Request for Continued Examination.

Thus, the claims now on file following entry of this RCE are claims 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 and 40.

It is respectfully submitted, that the examiner has incorrectly applied the art to date. It is further respectfully submitted that there is no support for some of the assumptions that the examiner appears to have made. Finally, it is submitted that the

examiner has failed to give due weight to many of the limitations set out in the claim when relying on any of the examiner's art comprising Bland, Ehrlich and Furuya.

Mixing vs Grinding

It is respectfully submitted that there is significant distinction between the words "mixing" and "grinding". The examiner appears to be locating art dealing with "mixing" and then suggesting that by reason of various words in those references, that "mixing" can be equated with "grinding" and in particular, the grinding referred to in the present application. It is respectfully submitted there is no support whatsoever for the examiner's co-mingling of the words "mixing" and "grinding".

There are very different mechanical unit operations involved between "mixing" and "grinding" with only, at best, a very modest amount of possible overlap.

The purpose of mixing, and mixing equipment, is to blend or mix various materials. Some size reduction of particles being mixed may occur. This is prevalent substantially when soft materials are mixed, typically in the food industry and then only with the use of relatively high intensity mixing equipment. Mixing will occur as a local, "micro scale" operation and also at larger scale, that is, over longer physical distances, "macro scale".

The purpose of grinding, or comminution, (the proper scientific term) or simply size reduction, is equally obvious from the terms used. Grinding is normally a highly energy intensive operation, as large amounts of energy must be expended to reduce the size of large ductile materials. Some grinding equipment, such as roller mills, will cause no mixing at all. Such equipment will simply crush the material with strong, compressive forces. Some equipment such as tumbling ball mills, will also cause some mixing (if different materials are being ground). Others, such as the Szego™ Mill, (which is the mill preferred by the present applicant), a planetary ring roller mill with grooved rollers, will cause mixing only locally, i.e. on a micro scale and that is relatively minor. Therefore, while some types of grinding equipment cause some small amount of mixing, mixing does not cause any significant amount of grinding, except for very soft materials.

Accordingly, it is respectfully submitted that there is no support for the examiner's position that prior art patents that discuss mixing have any application, whether alone or

in combination with any other references, to the grinding as set out in the claims of this application.

Positive Transport

It is respectfully submitted that the examiner is in error in the analysis of the term "positive transport". The examiner appears to be of the opinion that because material goes into a unit and comes out of a unit that that is what is "positive transport". That is not the accepted meaning of the term in the art. There are several reasons why material flowing through equipment will leave the equipment.

- 1) Gravity force from top to bottom.
- 2) Pressure force, in any direction. The pressure force or its equivalent may be created by pumping the materials (usually when wet, liquid or slurry) or by forcing a feed material in at one end and pushing the material in the equipment, out at the other end. Both of these are common in ordinary grinding equipment.
- 3) The third way, called sometimes positive transport is the third motion. In this case mechanical forces which are caused by the motion of the equipment or its components helps to push material through the equipment. Examples are centrifugal pumps, or fans, where the rotating vanes push the material preferably in one direction, or screw conveyors or the like, which often have more local action.

The Szego™ Mill has positive transport. In any vertical configuration, gravity is also important, but for sticky materials, the transporting by the inclined grooves in the rollers is as important or even more important. It is for this third reason that the Szego™ Mill is able to handle also high consistency, sticky pastes pushing them through the grinder. The pertinent claims refer to positive transport and the examiner has not cited any pertinent art to those claims.

Simultaneous

The claims of this application specify simultaneous grinding and hydration. It is respectfully submitted that the examiner has erred in giving no patentable weight to the term "simultaneous" as it appears in the claims and has provided no art references whatsoever dealing with the word "simultaneous".

It is to be noted that hydration is a chemical reaction between water and other materials (typically dry). There are at least two reasons why simultaneous grinding and hydration enhances hydration.

- 1) The contact between the ground dry material and water is greatly improved and hence the rate of mass transfer, i.e. transfer of water to the sites on the dry material surfaces where reaction may occur, is accelerated. In particular, when a particle is broken, i.e. fresh, new surfaces are created in water, contact is immediate and the reaction therefore rapid.
- 2) There may also be present a so-called "mechano-chemical effect" – that adding mechanical energy to a material enhances its chemical reactivity. This is a matter of providing the "activation energy" required to make most reactions go. It is a temporary phenomenon – just as the energy is added to the material (solid particles being cleaved) and before it simply turns into heat, thermal energy, it will be available, for a brief moment, to enhance the reactivity of the energized surface. Typically, to be beneficial, relatively large amounts of energy are needed...as provided in grinding.

There is an interplay between these two phenomena – one over comes the resistance to transport or transfer of the reactants to the reaction sites, and the other enhances the reaction rate. To grind the solid first and then subsequently contact it with water, will enhance the rate only by a larger surface area (small particles), and neither by 1) or 2) above. Hence, simultaneous, is important.

Bland Aggregate

With regard to the combination of references, the examiner appears to be of the view that the Bland patent, which teaches making of aggregate, could somehow be interpreted in view of the other reference, so that such product would be added to a furnace. It is believed that there is no motivation, teaching or suggestion in any of the art to make the combination as specified by the examiner.

It is respectfully submitted that if one reads Bland, the objective in making road aggregate is to make the pieces strong with minimal pore space, dense, and able to resist compressive pressures (e.g. in the road bed). If such pieces were to be fed to a fluidized bed boiler, at least the following will happen:

- 1) The pieces will collect at the bottom of the boiler, being bigger and more dense than the burning coal/coke or ashes or the powdered limestone.
- 2) On the bottom grid, these pieces, due to their size and density, are not properly fluidized. They will likely just tumble back and forth.
- 3) Due to that action, they will either reduce the air flow to the boiler or force an increase in the inlet pressure, thus causing reduced burning efficiency and increased energy consumption.
- 4) Likely, they will also cause mechanical trouble, including wearing out the bottom grid, or when the pieces get stuck, significantly reducing the area for air flow which may result in very uneven or less uniform fluidization in the bed.

Perhaps more importantly, such pieces would not contribute to sulfur capture as they will have very minimal contact with burning materials and/or combustion gases. Thus, it is respectfully submitted that anyone skilled in the art of dealing with fluidized bed combustion units would never permit, let alone consider, the desirability of feeding of materials such as discussed by Bland in combustion unit.

Based on all of the foregoing, it is respectfully submitted that there is absolutely no support whatsoever for the examiner's argument that based on WO, one would be tempted to throw the Bland material into a furnace. More particularly there is absolutely no suggestion in Bland as combined with any art relied upon by the examiner to date, which would teach, suggest or motivate, the feeding of such a product to a combustor when such a product would typically be viewed as negative in the operation of a combustion unit.

In view of all of the above, it is respectfully submitted that all of the claims of this application are in condition for allowance.

In the enclosed Request for Continued Examination (RCE) Transmittal we have paid the necessary fees for an extension of time of three months to respond to the examiner's action.

In view of the number of total claims cancelled and the additional claims added and in view of the number of independent claims cancelled and added, it is believed that addition fees are required for two additional independent claims and eight additional

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dependent claims. The government fee of \$400.00 is included in our firm cheque No. 8622 in respect of these additional claims.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,
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